PATENT ABSTRACTS OF JAPAN

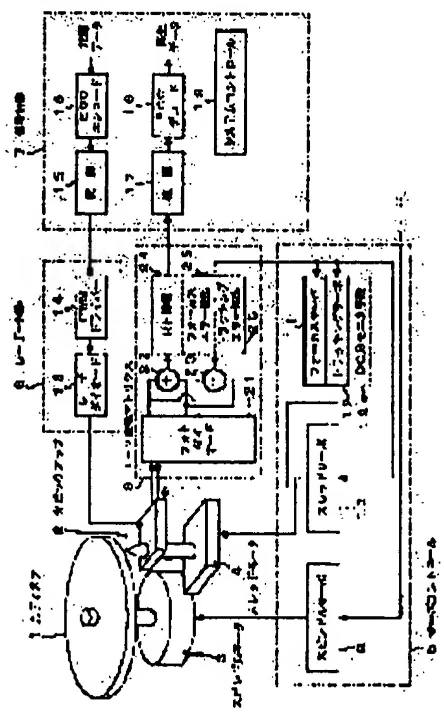
(11)Publication number : 10-340460
(43)Date of publication of application : 22.12.1998

(51)Int.Cl. G11B 7/085
G11B 7/09

(21)Application number : 09-148096
(22)Date of filing : 05.06.1997

(71)Applicant : SONY CORP
(72)Inventor : OSHIMA YOICHI

(54) OPTICAL DISK RECORDING AND REPRODUCING DEVICE



(57)Abstract:
PROBLEM TO BE SOLVED: To provide an optical disk recording and reproducing device which can perform stable pause operation even if DC offset is included.
SOLUTION: This optical disk recording and reproducing device moves an optical pickup on an optical disk 1, positions an optical pickup 2 to an object track position by a tracking servo circuit 12, irradiates the optical disk 1 with a light beam by an optical system of the optical pickup 2, and records or reproduces a recording mark. Further, when the optical pickup 2 is moved in the track direction of the optical disk 1 or the direction of the sector, an offset component is detected by a DC monitor means 12a from a tracking error signal of the tracking servo circuit 12, and pause operation is started at a position at which an offset component is made the minimum in the prescribed section.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or

application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]
[Claim 1] Move an optical pickup on a record medium and the above-mentioned optical pickup is positioned in the purpose truck location with a tracking means. In the optical disk record regenerative apparatus which a light beam is made to irradiate on the above-mentioned record medium according to the optical system of the above-mentioned optical pickup, and records or reproduces a record mark In case the above-mentioned optical pickup is moved in the direction of a truck or the direction of a sector of the above-mentioned record medium, an offset component is detected from the tracking error signal of the above-mentioned tracking means. The optical disk record regenerative apparatus characterized by making it move in the location in which the above-mentioned offset component serves as min in the predetermined section.
[Claim 2] It is the optical disk record regenerative apparatus characterized by carrying out migration of the above-mentioned optical pickup as [be / it / a track jump] in an optical disk record regenerative apparatus given in the 1st term of a claim.
[Claim 3] It is the optical disk record regenerative apparatus characterized by carrying out migration of the above-mentioned optical pickup as [be / it / one track jump by the side of the inner circumference of the above-mentioned record medium] in an optical disk record regenerative apparatus given in the 1st term of a claim.
[Claim 4] The predetermined section which detects the min of the above-mentioned offset component in an optical disk record regenerative apparatus given in the 1st term of a claim is an optical disk record regenerative apparatus characterized by carrying out as [be / it / the section for one rotation of the above-mentioned optical disk].
[Claim 5] The predetermined section which detects the min of the above-mentioned offset component in an optical disk record regenerative apparatus given in the 1st term of a claim is an optical disk record regenerative apparatus characterized by carrying out as [be / they / several frames of the regenerative signal of the above-mentioned optical disk].

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the pause actuation at the time of using a light beam for the compact disc (CD-ROM) or recordable compact disk (CD-R) only for [an optical disk] playbacks, and recording or reproducing data.
[0002]
[Description of the Prior Art] By progress of the multimedia which points to a highly information-oriented society, much more high-performance-izing of an optical disk and large capacity-ization are called for. This optical disk can be divided roughly into two kinds, the mold optical disk only for playbacks of only reproducing the information data recorded at the time of disk cutting from that function and the purpose of use, and the write once optical disk whose rewriting can record only at once and is impossible.
[0003] In such an optical disk, it sets by requiring large capacity-ization at the time of disk cutting or a postscript. Only by the groove record approach which records information data only on the groove section which consists of a slot spirally prepared on the record optical disk side Since the storage capacity demanded was not able to be satisfied, the land groove record approach which records information data also on the part called the land between the groove section and the groove section was adopted.
[0004] That is, in order to record information data on the predetermined truck on an optical disk, an optical pickup must be moved to up to the target truck of an optical disk, and a laser beam must be made to irradiate on a target truck in an optical disk record regenerative apparatus. For that, it is necessary to position an optical pickup to a target position. There is tracking servo system as servo system which moves an optical pickup to the location of the radial target of an optical disk.
[0005] Tracking servo system consists of a tracking coil of the actuator systems in an optical pickup, and a tracking servo circuit. An actuator system carries out tracking actuation of the optical pickup minutely for example, with a biaxial actuator.
[0006] And if a laser beam pursues and carries out the tracking of the truck, reads the address and gets to know difference with the target address, only the part will carry out minute seeking. Since it is difficult for stability to carry out seeking control when an eccentric rate is large at this time, it waits until an eccentric rate becomes small, and finally it reaches to a target truck, and actuation of record is performed by the land groove record approach which records information data on the land between the groove section on an optical disk, and the groove section.
[0007] The tracking by the push pull approach used for the conventional land groove record approach at drawing 4 is shown. The tracking by the conventional push pull method is explained using drawing 4 . In the land groove record approach which records information data also on the part called the lands L1, L2, and L3 between the groove sections G1 and G2, G3, and the groove sections G1 and G2 and G3 in drawing 4 A In order for the adjoining groove sections G1 and G2, G3, and the lands L1, L2, and L3 to record information data, it is necessary to perform tracking to each groove sections G1 and G2, G3, and

lands L1, L2, and L3.
[0008] The push pull method is an approach of detecting a tracking error, by taking out the light which carried out reflection diffraction by the groove sections G1 and G2 on the record thin film on an optical disk, and G3 as an output difference in respect of [where 2 ****s was taken on the photodiode] light-receiving. As shown in drawing 4 A, namely, a laser spot, the groove sections G1 and G2, the core of G3, Or when the core of the groove sections G1 and G2 called a laser spot and lands L1, L2, and L3, G3 and the groove sections G1 and G2, and the pars intermedia of G3 is in agreement After it carried out tracking and the truck has been in agreement, in drawing 4 B, the tracking error signal 101 as symmetrical reflection diffraction light distribution is acquired. In other than this, since tracking has not been carried out, it is in the condition from which the truck shifted, and they serve as a serpentine curve as reflection diffraction light distribution from which the amplitude from which optical reinforcement shifted in right and left differs. Thus, as the tracking error signal 101 is set to "0", tracking can be carried out to the groove sections G1 and G2, the core of G3, or the core of lands L1, L2, and L3.
[0009] Here, as shown in drawing 5 , offset might arise also with the inclination (radial tilt) of the radial direction of an optical disk 100. In drawing 5 , since it is the imbalance of optical reinforcement in order that the beam spot of the reflected light of an optical disk 100 may move only fand2deltatheta to the focal distance f of an objective lens 102 on a photodiode 103 when only deltatheta has an inclination in an optical disk 100 to the field which intersects perpendicularly with the optical axis of a laser beam, a push pull signal will offset.
[0010] Therefore, since light and darkness appear on a photodiode 103 when there is the beam spot in the center of a photodiode 103, and the beam spot crosses the truck of an optical disk 100, and the zero crossing point of the tracking error signal 101 takes the truck lead, tracking can be performed using this tracking error signal 101. However, when the beam spot shifts from the center of a photodiode 103 and moves (at i.e., when [the time of an objective lens 102 driving to a radial direction by tracking actuation, and when a radial tilt is in an optical disk 100]), in order that the optical intensity distribution of the beam spot may move on a photodiode 103, a racking error signal turns into a signal which has a part for DC offset used as a wave with a late period. Tracking cannot be performed using the tracking error signal which has such offset.
[0011] For example, when spindle servo system will be in a lock condition, the halt equipment of the disk regenerative apparatus which has the timing modification circuit which changes a track jump is indicated by JP,4-132056,A. In performing pause actuation, it reads, whenever an optical disk rotates one time, and he carries out 1 track jump of the point in the direction of inner circumference (the read-out direction and hard flow), and is trying to repeat this 1 track-jump actuation in the optical disk currently recorded by the constant linear velocity (CLV) in this disk regenerative apparatus. The wave form chart of one track jump when performing the conventional pause actuation to drawing 6 is shown. As shown in drawing 6 , 1 track-jump wave 105 shown by the tracking error signal TE becomes the wave which has a part for the DC offset 106 at the period of the disk 1 rotation 104, and the amount of [107] DC offset appears similarly at the period of the disk 1 following rotation.
[0012]
[Problem(s) to be Solved by the Invention] Thus, since pause actuation by one track jump was performed without regarding a part for this DC offset at all although the amount of [by the optical intensity distribution of the beam spot moving on a photodiode 103] DC offset appeared when a radial tilt was in an optical disk 100, there was un-arranging [that the pause actuation by one track jump became unstable] in 1 track-jump wave when performing the conventional pause actuation.
[0013] This invention is made in view of this point, and aims at offer of the optical disk record regenerative apparatus which can perform pause actuation stabilized even if the amount of DC offset was.
[0014]
[Means for Solving the Problem] The optical disk record regenerative apparatus of this invention moves an optical pickup on a record medium. In the optical disk record regenerative apparatus which position the above-mentioned optical pickup in the purpose truck location with a tracking means, and a light

beam is made to irradiate on the above-mentioned record medium according to the optical system of the above-mentioned optical pickup, and records or reproduces a record mark In case the above-mentioned optical pickup is moved in the direction of a truck or the direction of a sector of the above-mentioned record medium, an offset component is detected from the tracking error signal of the above-mentioned tracking means, and it is made to move in the location in which the above-mentioned offset component serves as min in the predetermined section.

[0015] According to the optical disk record regenerative apparatus of this invention, the following operations are carried out. This optical disk record regenerative apparatus moves an optical pickup on a record medium, positions the above-mentioned optical pickup in the purpose truck location with a tracking means, makes a light beam irradiate on the above-mentioned record medium according to the optical system of the above-mentioned optical pickup, and records or reproduces a record mark. Moreover, this optical disk record regenerative apparatus detects an offset component from the tracking error signal of the above-mentioned tracking means. And this optical disk record regenerative apparatus moves the above-mentioned optical pickup in the direction of a truck or the direction of a sector of the above-mentioned record medium in the location in which the above-mentioned offset component serves as min in the predetermined section.

[0016]

[Embodiment of the Invention] Below, the gestalt of this operation is explained. The optical disk which applies the gestalt of this operation is a compact disc (CD). There are some families in CD and there are CD-ROM only for playbacks and a CD-R which can be written in only once. The gestalt of this operation is applied to this CD family.

[0017] Next, the configuration of the gestalt of this operation applied to such an optical disk is shown. Drawing 1 is the block diagram showing the configuration of the optical disk record regenerative apparatus of the gestalt of this operation. First, the configuration of an optical disk record regenerative apparatus is explained. The optical disk record regenerative apparatus of this example has the servo control circuit 5 which controls an optical disk rotation drive control system, a coarse adjustment delivery drive control system, and each servo system of an optical pickup control system, the laser control circuit 6 which controls the laser power supplied to an optical pickup 2, the I-V transformation-matrix circuit 8 which acquires a playback RF signal, a focal error signal, and a tracking error signal from the reflected light of laser, and the signal-control circuit 7.

[0018] An optical disk rotation drive control system has the spindle servo circuit 9, a spindle motor 3, and an optical disk 1. Here, an optical disk 1 constitutes a record medium. A coarse adjustment delivery drive control system has the thread servo circuit 10 and the thread motor 4. An optical pickup control system has an optical pickup 2, the I-V transformation-matrix circuit 8, the focus servo circuit 11, the tracking servo circuit 12, and the laser control circuit 6. The photodiode 21 with which the I-V transformation-matrix circuit 8 detects the reflected light of laser by two parting planes here, The adder 22 adding 2 division signals, and the subtractor 23 which subtracts 2 division signals, The RF amplifying circuit 24 which supplies a servo signal to the thread servo circuit 10 while amplifying a playback RF signal from the output of an adder 22, It has the focal error detection circuit 25 which detects a focal error signal from the output of a subtractor 23, and the tracking error detector 26 which detects a tracking error signal from the output of a subtractor 23. Moreover, the laser control circuit 6 has the PWM driver 14 who carries out pulse width modulation of the laser light, and the laser diode 13 which emits light in laser light.

[0019] A signal-control circuit 7 has the system-control circuit 19 which controls each part of equipment, the ECC encoding circuit 16 which adds an error correction code to record data with the Lead Solomon product code, the modulation circuit 15 which carries out eight-to-fourteen modulation of the record data with which the error correction code was added, the demodulator circuit 17 which supply a servo signal to a spindle servo circuit 9 while carrying out the EFM recovery of the playback data, and the ECC decoding circuit 18 which carry out error correction processing with the Lead Solomon product code, and output playback data to playback data.

[0020] Here, a monitor is carried out by the period of an optical disk's 1 1 rotation of a part for DC offset

by the optical intensity distribution of the beam spot by the radial tilt of an optical disk 1 moving to the tracking servo circuit 12 on a photodiode 21, and it consists of especially this example so that it may have DC monitor means 12a which searches the time amount which carries out pause actuation by one track jump to stability.

[0021] Next, the connection relation of an optical disk record regenerative apparatus is shown. First, the connection relation of an optical disk rotation drive control system is shown. The spindle servo circuit 9 is connected with a spindle motor 3, and a spindle motor 3 is connected with an optical disk 1 through a rolling mechanism.

[0022] Next, the connection relation of a coarse adjustment delivery drive control system is shown. The thread servo circuit 10 is connected with the thread motor 4, and the thread motor 4 is connected with the optical pickup 2 of an optical pickup control system through a rough delivery device.

[0023] Next, the connection relation of an optical pickup control system is shown. An optical pickup 2 is connected with the photodiode 21 of the I-V transformation-matrix circuit 8, two split outputs of a photodiode 21 are connected with a subtractor 23 while connecting with an adder 22, and an adder 22 and a subtractor 23 are connected with the focal error detection circuit 25 and the tracking error detector 26 while connecting with the RF amplifying circuit 24.

[0024] Moreover, the focal error detection circuit 25 and the tracking error detector 26 are connected with the focus servo circuit 11 and the tracking servo circuit 12, and the focus servo circuit 11 and the tracking servo circuit 12 are connected to the focal coil and tracking coil which an optical pickup 2 does not illustrate.

[0025] Next, the connection relation of a signal-processing system is shown. The RF amplifying circuit 24 is connected with the demodulator circuit 17 of the signal-control circuit 7, and a demodulator circuit 17 is connected with the ECC decoding circuit 18. Moreover, the ECC encoding circuit 16 is connected with a modulation circuit 15, a modulation circuit 15 is connected with the PWM driver 14 of the laser control circuit 6, and the PWM driver 14 is connected with laser diode 13, and laser diode 13 is formed so that a predetermined laser beam may be formed in an optical pickup 2.

[0026] Moreover, the optical disk record regenerative apparatus is connected with the host computer through the system controller 19 and the interface circuitry which is not illustrated.

[0027] Thus, outline actuation of the constituted optical disk record regenerative apparatus is explained. When the instruction from the host computer which is not illustrated performs record or playback of an information signal to an optical disk record regenerative apparatus, after making seek operation the target truck location on an optical disk 1 by the thread motor 4 and positioning an optical pickup 2 in it from a host computer, make a tracking coil and a focal coil drive by the tracking servo circuit 12 and the focus servo circuit 11, tracking and a focus are made to tune finely, and it doubles with desired value.

[0028] While eliminating the information on the part which makes leather power erasion power level beforehand by the laser control circuit 6, and is not recorded in the case of record, the information signal which adjusted leather power to light power level, recorded the information signal on the target truck location, adjusted leather power to lead power level by the laser control circuit 6 on the occasion of playback, and was recorded on the target truck location is reproduced.

[0029] By the signal-control system, the system-control circuit 19 supplies the command of a rotation instruction to the spindle servo circuit 9 of the servo control circuit 5 first based on a host computer. The spindle servo circuit 9 supplies a drive signal to a spindle motor 3 with this command, and rotates a spindle motor 3. The servo signal by which synchronous detection was carried out from the demodulator circuit 17 based on the playback RF signal is supplied to the spindle servo circuit 9.

[0030] Next, based on a host computer, the system-control circuit 19 supplies the command of a rough delivery instruction to the thread servo circuit 10. An optical pickup 2 reads the information signal of a current location in an optical disk 1, and supplies a RF signal, an addition signal, and a subtraction signal to the RF amplifying circuit 24, the focal error detection circuit 25, and the tracking error detector 26 through a photodiode 21, an adder 22, and a subtractor 23. The tracking error detector 26 generates a tracking error signal from a difference signal, and supplies it to the thread servo circuit 10. The thread servo circuit 10 generates a drive signal based on a tracking error signal, and supplies a drive signal to

the thread motor 4. The thread motor 4 carries out rough seek operation of the optical pickup 2 through the rough delivery device which is not illustrated based on a drive signal.
[0031] Actuation of seeking servo system consists of two, thread motor 4 system and the actuator system in an optical pickup 2. Thread motor 4 system carries out rough seek operation of the optical pickup 2 by the thread motor 4, and positions by detecting a location with the encoder which is not illustrated. An actuator system carries out minute seek operation of the optical pickup 2 with the biaxial actuator using the tracking coil which is not illustrated.
[0032] Such an operating sequence of seeking servo system is explained below. First, rough seek operation is carried out to near the target truck location. Rough seeking is carried out, and even if an optical pickup 2 stops near the target address, it does not immediately stop, but it vibrates, and the moving part of the actuator in an optical pickup 2 waits for the predetermined settling time, and stops.
[0033] Next, in order to read the address information which reached, truck drawing-in actuation is carried out. Here, when a truck eccentricity rate is large, activation of truck drawing-in actuation is drawn, and it waits for this actuation until it is that of a lifting or a cone and an eccentric rate becomes near the zero about an error.
[0034] And if a laser beam pursues a truck, makes a tracking coil drive with the drive signal from the tracking servo circuit 12, carries out tracking by on-truck, reads the address and gets to know difference with the target address, only the part will carry out minute seeking. At this time, an optical pickup 2 reads the information signal of a current location in an optical disk 1, and supplies it to the tracking error detector 26.
[0035] That is, a photodiode 21 receives the laser beam reflected with the optical disk 2 on 2 parting planes. A photodiode 21 changes into an electrical signal 2 division laser beam which received light, and supplies it to a subtractor 23. A subtractor 23 subtracts 2 division signals and generates a difference signal. The tracking error detector 26 detects a tracking error signal from a difference signal, and supplies it to the tracking servo circuit 12. The tracking servo circuit 12 performs the tracking of an optical pickup 2 with the tracking coil of the biaxial actuator which is not illustrated based on a tracking error signal. Moreover, the focal error detection circuit 25 detects a focal error signal from an information signal, and supplies it to the focus servo circuit 11. The focus servo circuit 11 performs focusing of an optical pickup 2 with the focal coil of the biaxial actuator which is not illustrated based on a focal error signal.
[0036] Since it is difficult for stability also at this time to carry out seeking control when an eccentric rate is large, it waits until an eccentric rate becomes small, and finally it reaches to a target truck, and actuation of record or playback is performed.
[0037] After positioning an optical pickup 2 in a target truck location, actuation of record or playback is performed as follows. At the time of playback, the system-control circuit 19 supplies a playback command to the PWM driver 14 of the laser control circuit 6. The PWM driver 14 adjusts laser luminescence power to playback power level, and supplies it to laser diode 13. A laser diode 13 irradiates laser light through a lens at an optical disk 1. A photodiode 21 receives the laser beam reflected with the optical disk 1 on 2 parting planes. A photodiode 21 changes into an electrical signal 2 division laser beam which received light, and supplies it to an adder 22. An adder 22 adds 2 division signals and generates a playback RF signal.
[0038] A playback RF signal is supplied to the RF amplifying circuit 24. The RF amplifying circuit 24 carries out RF magnification of the playback data, and supplies them to a demodulator circuit 17. A demodulator circuit 17 carries out the EFM recovery of the playback data. A demodulator circuit 17 supplies the playback data to which it restored to the ECC decoding circuit 18. The ECC decoding circuit 18 carries out error correction processing with the Lead Solomon product code, and outputs playback data to playback data. The decoded information signal is supplied to a host computer.
[0039] At the time of record, the system-control circuit 19 supplies a record command to the PWM driver 14 of the laser control circuit 6. The record data supplied from the host computer are supplied to the ECC encoding circuit 16. The ECC encoding circuit 16 adds an error correction sign to record data with the Lead Solomon product code. The ECC encoding circuit 16 supplies the record data with which

the error correction sign was added to a modulation circuit 15. A modulation circuit 15 carries out eight-to-fourteen modulation of the record data with which the error correction code was added. A modulation circuit 15 supplies the modulated record data to the PWM driver 14 of the laser control circuit 6. The PWM driver 14 does pulse width modulation of the record data by which eight-to-fourteen modulation was carried out based on the record command, and supplies the laser flashing caution signal of light power level to laser diode 13. A laser diode 13 irradiates a laser beam through a lens at an optical disk 1. After the record thin film of an optical disk 1 was heated and has made it amorphous by the laser beam, record data are recorded on a target truck location.

[0040] By DC monitor means 12a of the tracking servo circuit 12, a monitor is carried out by the period of an optical disk's 1 1 rotation of a part for DC offset by the optical intensity distribution of the beam spot by the radial tilt of an optical disk 1 moving on a photodiode 21, the amount of this DC offset searches the minimum time amount, and especially the gestalt of this operation here is made to carry out pause actuation by one track jump to stability by this time amount.

[0041] First, the sequence of 1 track-jump actuation of such track jump servo system of minute seeking is explained below. First, minute seek operation is carried out to near the location by the side of 1 truck inner circumference made into a target. One track jump of minute seeking is actuation to which a light beam is moved by one truck by adding pulse current to the moving part of the actuator in an optical pickup 2, suspending an optical pickup 2 to the target address.

[0042] That is, if a laser beam pursues a truck, makes a tracking coil drive with the drive signal from the tracking servo circuit 11, carries out tracking by on-truck, reads the address and gets to know the difference for one truck with the target address, only the difference for the one truck will carry out minute seeking. At this time, an optical pickup 2 reads the information signal of a current location in an optical disk 1, and supplies it to the tracking error detector 26.

[0043] Hereafter, actuation of DC part monitor in such pause actuation is explained. The flow chart is shown in the wave form chart of DC part monitor for several frames of pause actuation of the gestalt of this operation to drawing 2 , and drawing 3 . As shown in drawing 3 , there is a pause demand from a host side at step S1 at n frames (here, n is the natural number and is the frame number of the image data of record or a regenerative signal.). Specifically in drawing 1 , the command of a pause demand is supplied to the system-control circuit 19 of the signal-control circuit 7 in n frames from a host computer. At step S2, a part for DC of the tracking error signal TE in n frames is measured. In drawing 1 , to DC part monitor means 12a of the tracking servo circuit 12 of the servo control circuit 5, specifically, the system-control circuit 19 supplies a control signal so that a part for DC of the tracking error signal TE in n frames may be measured. At this time, a part for DC35 of n frame 30 of the tracking error signal TE is measured by DC part monitor means 12a in drawing 2 .

[0044] Next, in drawing 3 , a part for DC of the tracking error signal TE in n+1 frame is measured at step S3. In drawing 1 , to DC part monitor means 12a of the tracking servo circuit 12 of the servo control circuit 5, specifically, the system-control circuit 19 supplies a control signal so that a part for DC of the tracking error signal TE in n+1 frame may be measured. At this time, a part for DC36 of n+1 frame 31 of the tracking error signal TE is measured by DC part monitor means 12a in drawing 2 .

[0045] And in drawing 3 , a part for DC of the tracking error signal TE in a n+m frame is measured by step S4 (here, m is the natural number and is the frame number of the image data of record or a regenerative signal.). In drawing 1 , the system-control circuit 19 changes the time amount to which only the n+m (for example, m= 4) frame of part extent for optical disk 1 rotation (several frames) should carry out pause actuation from n frames to DC part monitor means 12a of the tracking servo circuit 12 of the servo control circuit 5, and specifically, it supplies a control signal so that a part for DC of the tracking error signal TE in each frame may be measured. At this time, a part for a part for a part for DC37 of n+2 frame 32 of the tracking error signal TE and DC38 of n+3 frame 33 and DC39 of n+4 frame 34 is measured by DC part monitor means 12a in drawing 2 , respectively. Thus, the monitor of the part for DC of the tracking error signal TE of the n+m frame of part extent for optical disk 1 rotation (several frames) is carried out by DC part monitor means 12a from n frames. Here, the system-control circuit 19 memorizes a part for DC of the tracking error signal TE of a n-n+m frame in internal memory.

[0046] In drawing 3 , pause actuation is carried out to the last at step S5 by the fewest time amount for DC of the tracking error signal TE in n frames - a n+m frame. Specifically in drawing 1 , the system-control circuit 19 searches n - n+4 frame time corresponding to a part for DC of a frame with the smallest voltage level among those for DC 35, 36, 37, 38, and 39 of the tracking error signal TE in the time amount of 30, 31, 32, 33, and 34. The system-control circuit 19 supplies the control signal which starts a track jump in the location of the time amount for fewest DC36 which shows n+1 31 to the tracking servo circuit 12 of the servo control circuit 5. The tracking servo circuit 12 supplies a pulse to the tracking actuator of an optical pickup 2 so that one track jump may be started to this time amount of n+1 frame 31. Thus, pause actuation is performed to the inner circumference side of an optical disk 1 by the tracking actuator of an optical pickup 2 that there is no effect in a part for DC by [which is little time amount for fewest DC36] performing n+1 track jump [one] by the time amount of 31.
[0047] Thus, in the servo control circuit 5, since the digital servo by digital one PLL is performed, since the monitor of the part for DC of the tracking error signal TE can be carried out to the timing of the frame time of arbitration, in DC part monitor means 12a of the tracking servo circuit 12, it is not necessary to establish an addition circuit in others.
[0048]
[Effect of the Invention] The optical disk record regenerative apparatus of this invention moves an optical pickup on a record medium. In the optical disk record regenerative apparatus which position the above-mentioned optical pickup in the purpose truck location with a tracking means, and a light beam is made to irradiate on the above-mentioned record medium according to the optical system of the above-mentioned optical pickup, and records or reproduces a record mark In case the above-mentioned optical pickup is moved in the direction of a truck or the direction of a sector of the above-mentioned record medium, an offset component is detected from the tracking error signal of the above-mentioned tracking means. Since it was made to move in the location in which the above-mentioned offset component serves as min in the predetermined section DC gain of the case where eccentricity reproduces a record signal to a large record medium, and the tracking error signal from a tracking means does so the effectiveness that stable track jump actuation can be carried out also by the system which is not fully securable.
[0049] Moreover, in ****, since it was made for migration of the above-mentioned optical pickup to be a track jump, even if the optical disk record regenerative apparatus of this invention is a record medium the amount of DC offset is, it does so the effectiveness that pause actuation by the stable track jump can be carried out.
[0050] Moreover, in ****, since it was made for migration of the above-mentioned optical pickup to be one track jump by the side of the inner circumference of the above-mentioned record medium, even if the optical disk record regenerative apparatus of this invention is a record medium the amount of DC offset is, it does so the effectiveness that pause actuation by one stable track jump can be carried out, by performing one track jump by the side of the inner circumference of a record medium in the location where an offset component serves as min.
[0051] Moreover, the optical disk record regenerative apparatus of this invention In ****, the predetermined section which detects the min of the above-mentioned offset component By moving in the location in which an offset component serves as min in the section for one rotation of an optical disk, since it was made to be the section for one rotation of the above-mentioned optical disk The effectiveness that track jump actuation stabilized in the location where an offset component serves as min also to a record medium with large eccentricity can be carried out is done so.
[0052] Moreover, the optical disk record regenerative apparatus of this invention In ****, the predetermined section which detects the min of the above-mentioned offset component By moving in the location in which an offset component serves as min in the section for several frames of the regenerative signal of an optical disk, since it was made to be several frames of the regenerative signal of the above-mentioned optical disk The effectiveness that track jump actuation stabilized in the location where an offset component serves as min also to a record medium with large eccentricity can be carried

out is done so.

[Translation done.]

* NOTICES *

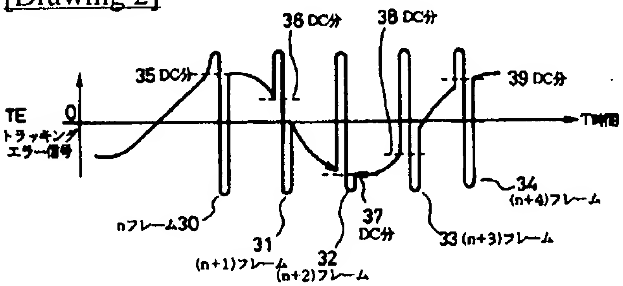
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the optical disk record regenerative apparatus of the gestalt of this operation.
[Drawing 2] It is the wave form chart showing DC monitor for several frames of pause actuation of the gestalt of this operation.
[Drawing 3] It is the flow chart Fig. showing DC monitor for several frames of pause actuation of the gestalt of this operation.
[Drawing 4] It is drawing showing the tracking by the conventional push pull method, drawing 4 A is drawing showing Land L and Groove G, and drawing 4 B is drawing showing a tracking error signal.
[Drawing 5] It is drawing showing the offset by the inclination of the conventional optical disk.
[Drawing 6] It is the wave form chart showing one track jump of the conventional pause actuation.
[Description of Notations]
1 [-- Thread motor,] -- An optical disk, 2 -- An optical pickup, 3 -- A spindle motor, 4 5 -- A servo control circuit, 6 -- A laser control circuit, 7 -- Signal-control circuit, 8 -- An I-V transformation-matrix circuit, 9 -- A spindle servo circuit, 10 -- Thread servo circuit, 11 -- A focus servo circuit, 12 -- By the tracking servo circuit and 12 a--DC, monitor means, 13 -- A laser diode, 14 -- An PWM driver, 15 -- Modulation circuit, 16 -- An ECC encoding circuit, 17 -- A demodulator circuit, 18 -- ECC decoding circuit, 19 [-- An adder, 23 / -- A subtractor, 24 / -- RF amplifier, 25 / -- A focal error detection circuit, 26 / -- Tracking error detector] -- A system-control circuit, 20 -- A collimator lens, 21 -- A photodiode, 22

[Translation done.]

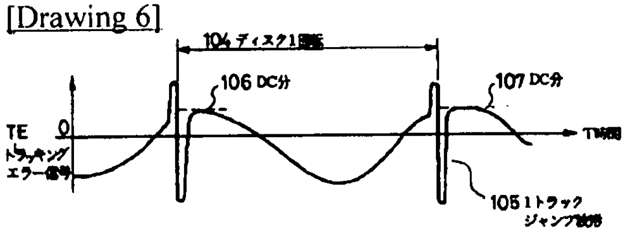
DRAWINGS

[Drawing 2]



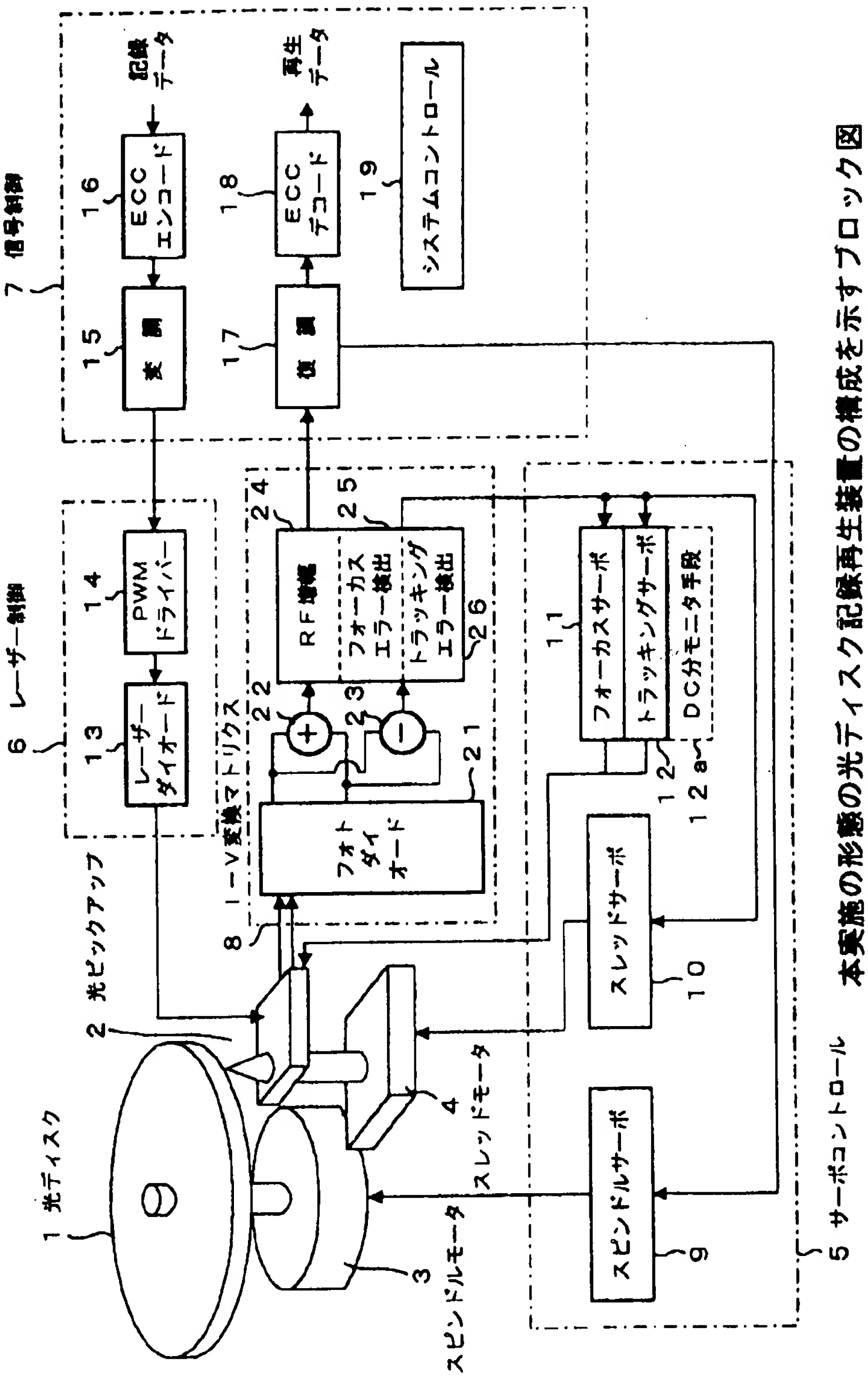
本実施の形態のポーズ動作の数フレーム分の
DC分モニタを示す波形図

[Drawing 6]



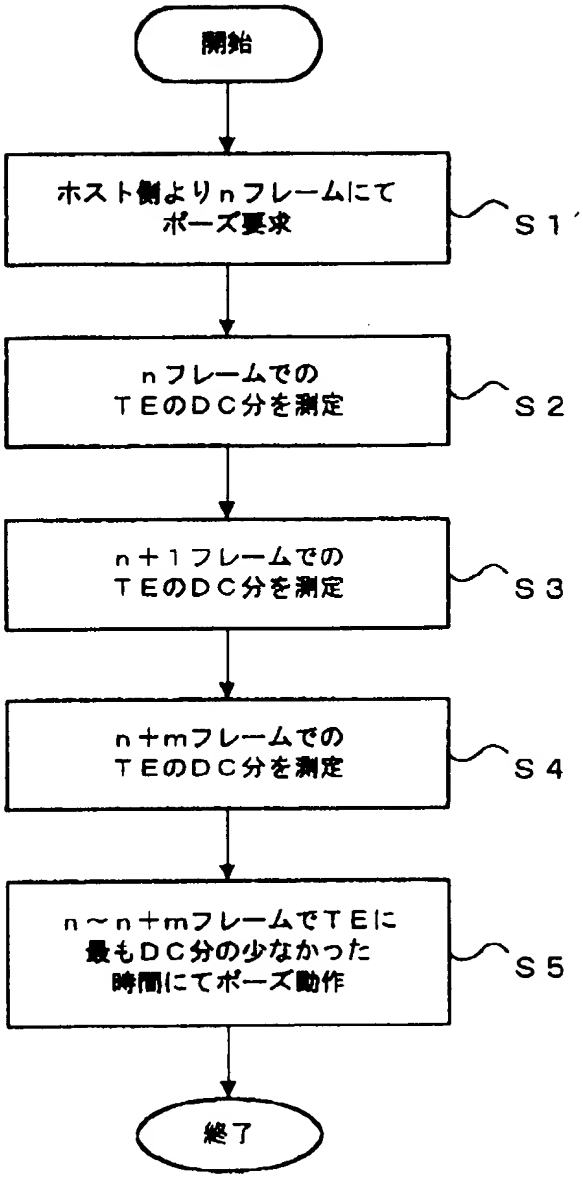
従来のポーズ動作のときの
1トラックジャンプを示す波形図

[Drawing 1]



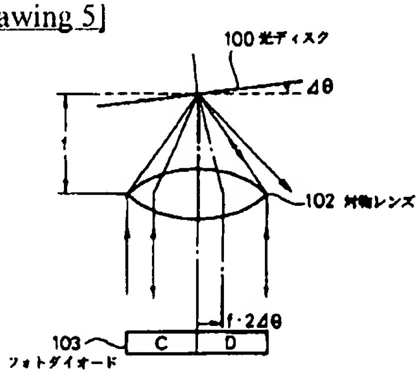
本実施の形態の光ディスク記録再生装置の構成を示すブロック図

[Drawing 3]



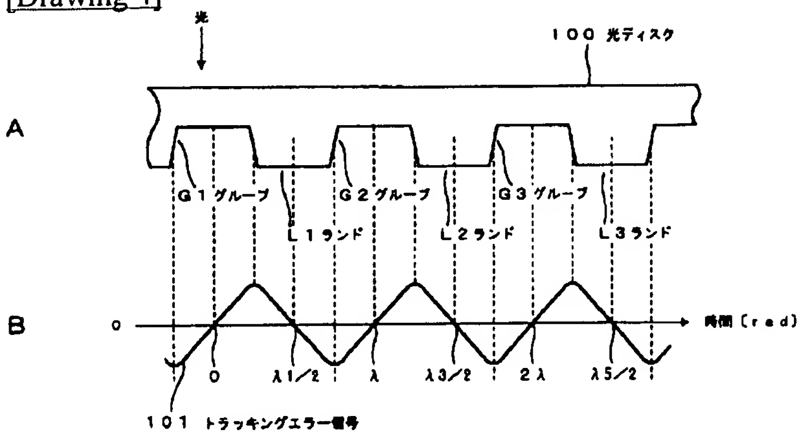
本実施の形態のポーズ動作の数フレーム分の
ＤＣ分モニタを示すフローチャート

[Drawing 5]



従来の光ディスクの傾きによる
オフセットを示す図

[Drawing 4]



従来のプッシュプル法によるトラッキングを示す図

[Translation done.]